Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2023

Marking Scheme

Design and Communication Graphics

Higher Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

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Leaving Certificate Examination 2023

Design and Communication Graphics

Higher Level

Marking Scheme

Note: Other valid solutions are acceptable and are marked accordingly.

Question A-1

MARKS

(a) Complete the elevation *(11)*

(i) Identify points on the ellipse in plan **2**

(ii) Locate points in the end view **2**

(iii) Projection of points from ellipse in plan to the elevation **2**

(iv) Locate points on the curve in the elevation..... **3**

(v) Draw the curve in elevation ……. (Any = 1) **2**

(b) One-piece surface development *(9)*

(vi) Determine true shape of the outline of surface **A** **3**

(vii) Establish points on the curve on surface **A**..... **3**

(viii) Draw the curve in the surface development **1**

(ix) Determine the development of surface **B** in correct position **2**

Total = 20

Question A-2

MARKS

(a) Location of line of eccentricity and vertex *(9)*

(i) Location of a point on the line of eccentricity **4**

(ii) Draw the line of eccentricity **1**

(iii) Location of the vertex **4**

(b) Draw the hyperbola *(11)*

(iv) Location of 3 points below latus rectum **4**

(v) Location of 3 points above latus rectum **4**

(vi) Draw curve …. (any = 1) **3**

Total = 20

Question A-3

MARKS

(a) Determine the traces of the plane ABCD *(8)*

(i) Extend edge **CD** in plan to intersect the XY line (H.T.) **2**

(ii) Establish a point on the vertical trace in elevation **4**

(iii) Draw the vertical trace **2**

(b) Complete the elevation of the label *(12)*

(iv) Project points from plan **2**

(v) Use of appropriate method to establish points in elevation **6**

(vi) Draw the front of the label **2**

(vii) Complete the elevation including hidden detail **2**

Total = 20

Question A-4

MARKS

(a) Plan and elevation of the line of intersection *(15)*

(i) Horizontal section in elevation through both planes **3**

(ii) Establish a second point on the line of intersection in plan **6**

(iii) Draw the plan of the line of intersection **3**

(iv) Draw the elevation of the line of intersection **3**

(b) Draw true shape of plane DEF (*5)*

(v) Use of appropriate method to determine true shape **1**

(vi) Determine correct vertices **2**

(vii) Draw true shape of surface **DEF** **2**

Total = 20

Question B-1

MARKS

(a) Elevation and Plan as given *(32)*

(i) Draw the pentgonal based pyramid in plan **5**

(ii) Draw the outline of the traingular prism in plan **4**

(iii) Draw the elevation of the pentagonal based prism **4**

(iv) Draw the outline elevation of the inclined triangular prism **5**

(v) Complete left-hand side of the triangular based prism in elevation..... **3**

(vi) Complete left-hand side of the triangular based prism in plan..... **5**

(vii) Horizontal detail on right-hand side of the triangular based prism in elevation ... **1**

(viii) Complete right-hand side of the triangular based prism in plan **4**

(ix) Vertical detail on right-hand side of the triangular based prism in elevation **1**

(b) Complete the projections of the desk lamp *(28)*

(x) Establish interpenetration points on left hand side of plan **4**

(xi) Complete left-hand side of plan including hidden detail **3**

(xii) Establish interpenetration points on right hand side **4**

(xiii) Establish turning points on right hand side **4**

(xiv) Project turning points to plan or elevation **3**

(xv) Complete right-hand side of plan **5**

(xvi) Complete right-hand side of elevation **5**

Total = 60

Question B-2

MARKS

(a) Elevation and Plan of intersecting planes ABCD and BCEF *(16)*

(i) Draw given plan of plane **BCEF** and edge **CD** **4**

(ii) Draw given elevation of plane **BCEF** and edge **CD** **4**

(iii) Establish corner **A** in elevation and complete elevation **4**

(iv) Project corner **A** to plan and complete plan **4**

(b) Dihedral Angle between planes ABCD and BCEF *(18)*

(v) X_1Y_1 parallel to line of intersection **AB** **4**

(vi) Projection of planes and line of intersection on new X_1Y_1 ..... **4**

(vii) New X_2Y_2 perpendicular to line of intersection **5**

(viii) Projection of planes as lines and indicating dihedral angle **5**

(c) Establish point P and determine the true length of DP *(16)*

(ix) Establish point **P** on the true length of edge **BC** **4**

(x) Project **P** to plan and elevation **4**

(xi) Draw the plan and elevation of the line **DP** **4**

(xii) Use of appropriate method to determine the true length of the line **DP** **2**

(xiii) Determine and indicate the true length of **DP** **2**

(d) True angle between AB and BF *(10)*

(xiv) Use of appropriate method to determine the true angle between **AB** and **BF** **3**

(xv) Determine true length of **AB** **2**

(xvi) Determine true length of **BF** **2**

(xvii) Establish the true angle between **AB** and **BF** **3**

Total = 60

Question B-3

MARKS

(a) Axonometric axes and isosceles triangle *(8)*

(i) Draw axonometric axes X, Y, and Z orientated as shown (1,1,1)..... **3**

(ii) Draw isosceles triangle **abc** **5**

(b) Draw end elevation and plan, orientated as shown *(18)*

(iii) Correct development of YZ plane in required orientation **4**

(iv) Draw end elevation as given **6**

(v) Correct development of XZ plane in required orientation **4**

(vi) Draw plan as given **4**

(c) Complete the dimetric projection of the pod *(34)*

(vii) Projections from end elevation and plan..... **3**

(viii) Determine points on curves in axonometric view **8**

(ix) Draw curves …….(Any = 1) **5**

(x) Draw the pod floor **3**

(xi) Draw the seat ends..... **4**

(xii) Draw table support and tabletop end..... **3**

(xiii) Draw division between glass and solid cover **3**

(xiv) Complete table top and seats **5**

Total = 60

Question C-1

MARKS

(a) Earthworks on pathway *(46)*

Earthworks between A and B (Level) - Embankment

(i) Draw parallel lines at 10 mm intervals **4**

(ii) Identify intersections with contours and draw curves **4**

Earthworks between A and B (Level) - Cutting

(iii) Draw parallel lines at 7.5 mm intervals **4**

(iv) Identify intersections with contours and draw curves **4**

Earthworks on curve section between B and C (Level) – Cutting

(v) Draw parallel arcs at 7.5 mm interval..... **3**

(vi) Identify intersections with contours and draw curve **3**

Earthworks on curve section between B and C (Level) – Embankment

(vii) Draw parallel arcs at 10 mm interval..... **3**

(viii) Identify intersections with contours and draw curve **3**

Earthworks between C and D (Rising) - Cutting

(ix) Draw required 7.5mm arc at **C** and draw tangent **3**

(x) Draw parallel lines at 7.5mm intervals **3**

(xi) Identify intersections with contours and draw curve **3**

Earthworks between C and D (Rising) – Embankment

(xii) Draw required 10mm arc at **D** and draw tangent **3**

(xiii) Draw parallel lines at 10mm intervals **3**

(xiv) Identify intersections with contours and draw curve **3**

(b) Elevation, strike and dip of the canopy *(14)*

(xv) Locate points in elevation on support poles **P** and **Q**..... **2**

(xvi) Establish point on pole **R** in elevation and draw the canopy in elevation **4**

(xvii) Determine Strike line **4**

(xviii) Establish Dip Angle..... **4**

Total = 60

Question C-2

MARKS

(a) Draw given elevation of parabolic curve EBD *(16)*

(i) Draw rectangular outline of parabola **4**

(ii) Construction to determine points on parabola on RHS (or LHS) **6**

(iii) Mirror points to the other side …… **3**

(iv) Draw parabolic curve **EBD** in elevation ……. (any curve = 1) **3**

(b) Outline end view *(10)*

(v) Draw rectangular outline of parabola **3**

(vi) Construction to determine points on parabola **4**

(vii) Draw parabolic curve **ABC** in end view…….. (any curve = 1) **3**

(c) Plan and elevation of tent *(26)*

(viii) Locate points **A**, **C**, **D**, and **E** **4**

(ix) Establish widths on curve in plan (top or bottom half) **8**

(x) Mirror points in plan **2**

(xi) Draw curve…….. (any curve = 1)..... **3**

(xii) Draw edges **AE** and **CE** **2**

(xiii) Establish heights for curve **CE** in elevation **4**

(xiv) Draw curve **CE** in elevation…….. (any curve = 1)..... **3**

(d) True shape of curve CE *(8)*

(xv) Establish widths on true shape **2**

(xvi) Locate points on true shape curve **CE** **3**

(xvii) Draw true shape curve…….. (any curve = 1) **3**

Total = 60

Question C-3

MARKS

(a) Draw the given elevation of the dipping cone *(8)*

(i) Draw the given elevation **8**

(b) Project the plan of the dipping cone *(21)*

(ii) Draw plan of the given circles **3**

(iii) Establish generators of the cone in plan **3**

(iv) Draw the generators in elevation **3**

(v) Establish points on curve in plan **8**

(vi) Draw the curve in plan …… (Any = 1) **4**

(c) Surface development of surface A (25)

(vii) Location of apex in surface development **3**

(viii) Transfer longest generator length to surface development **3**

(ix) Establish 12 elements in surface development **4**

(x) Transfer shortest generator length to surface development **2**

(xi) Determine intermediate distances for cut section **6**

(xii) Draw the curve in surface development **3**

(xiii) Complete the surface development **4**

(d) Elevation of one focal sphere *(6)*

(xiv) Determine centre point for focal sphere **3**

(xv) Draw the focal sphere …… (Any = 1) **3**

Total = 60

Question C-4

MARKS

(a) Line Diagram and Combined Movement *(29)*

(i) Draw line diagram as given (including **AB**, **BC** and Rectangle) **8**

(ii) Draw arc **AB** for one quarter of a revolution **4**

(iii) Establish min of 5 angular division lines (15°) to locate **B** for each movement **5**

(iv) Locate corresponding **C** for each movement **8**

(v) Draw required locus (any = 1) **4**

(b) Helical Walkway *(31)*

(vi) Draw outline plan and elevation of cylinder **4**

(vii) Locate points **A** and **B** in elevation and plan **6**

(viii) 30° divisions in plan **2**

(ix) Corresponding division of height between **A** and **B** in elevation **4**

(x) Determine points on helix (min 7, incl. "turning" points) ..... (7×1) **7**

(xi) Draw required helix…. (any = 1) **3**

(xii) Construction to locate further points above **B** **3**

(xiii) Draw helix extension to locate required point **2**

Total = 60

Question C-5

MARKS

Sectional Elevation *(60)*

Assembly *(6)*

(i) Relative positioning of components **6**

Main Body *(26)*

(ii) Complete outline of base **4**

(iii) Outline of the upper portion of Main Body **10**

(iv) Inner detail of the Main Body **8**

(v) Offset inner detail of Main Body **4**

Handle *(9)*

(vi) Required outline of the Handle **9**

Punch *(5)*

(vii) Outline of the Punch **4**

(viii) Inner detail of the Punch **1**

Lower Support *(3)*

(ix) Outline of the Lower Support **2**

(x) Inner detail of the Lower Support **1**

Pin *(2)*

(xi) Outline of the Pin **2**

Spring (2)

(xii) Representation of the Spring **2**

M6 x 20 Set Screw (1)

(xiii) Representation of the Set Screw **1**

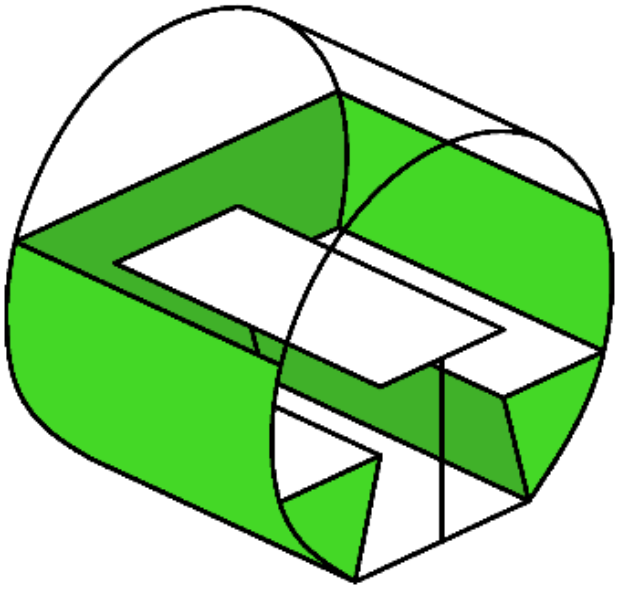
Completion of drawing (6)

(xiv) Presentation, hatching and centrelines **6**

Total = 60

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2023



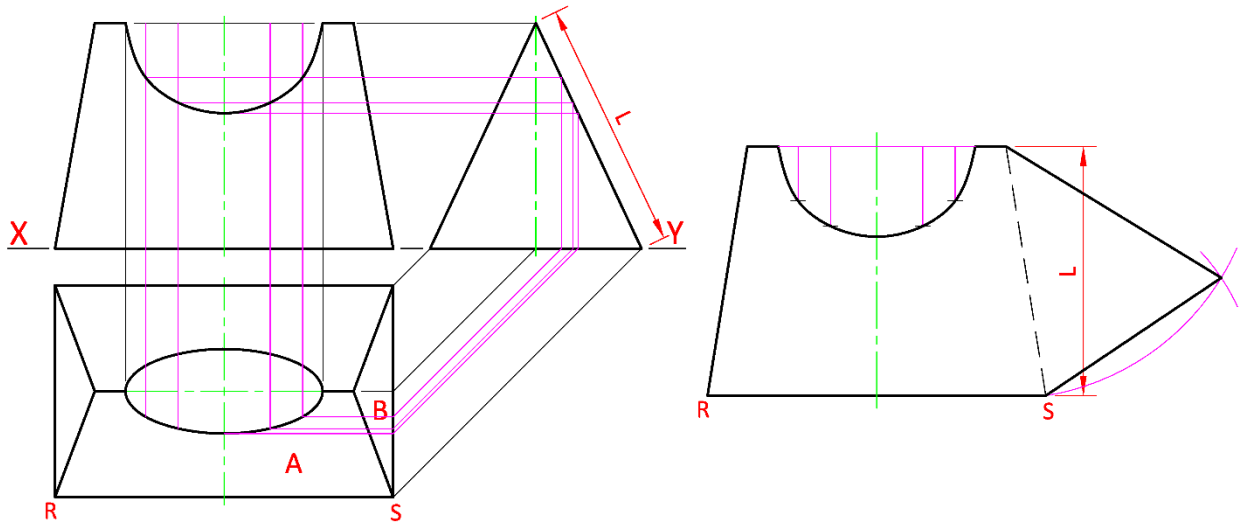
Design and Communication Graphics

Higher Level

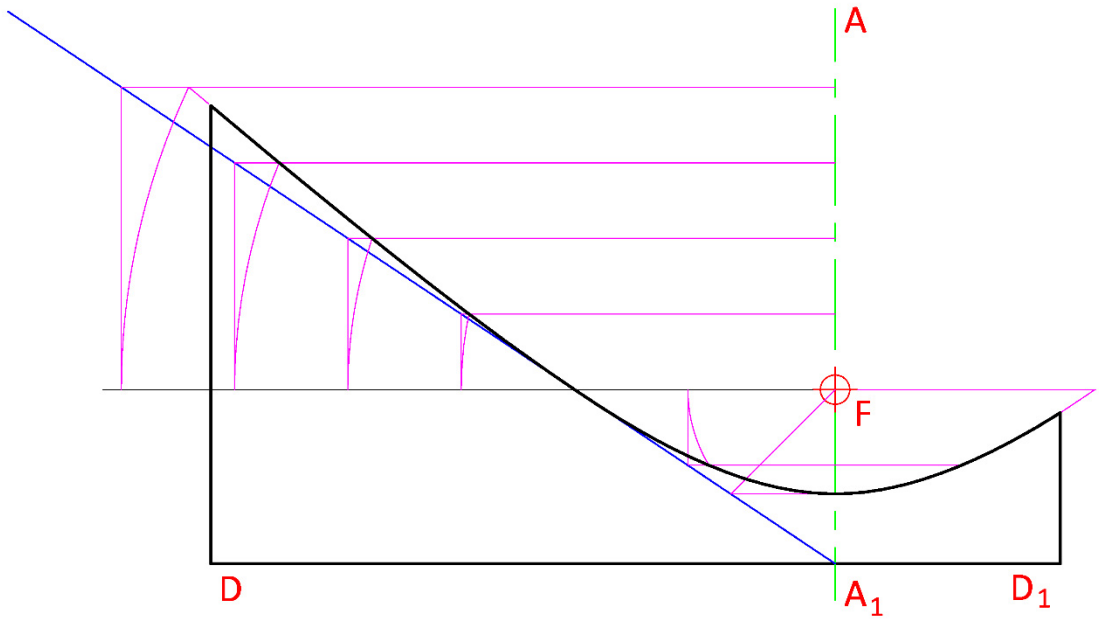
Sample Solutions

Note: Other valid solutions are acceptable and are marked accordingly.

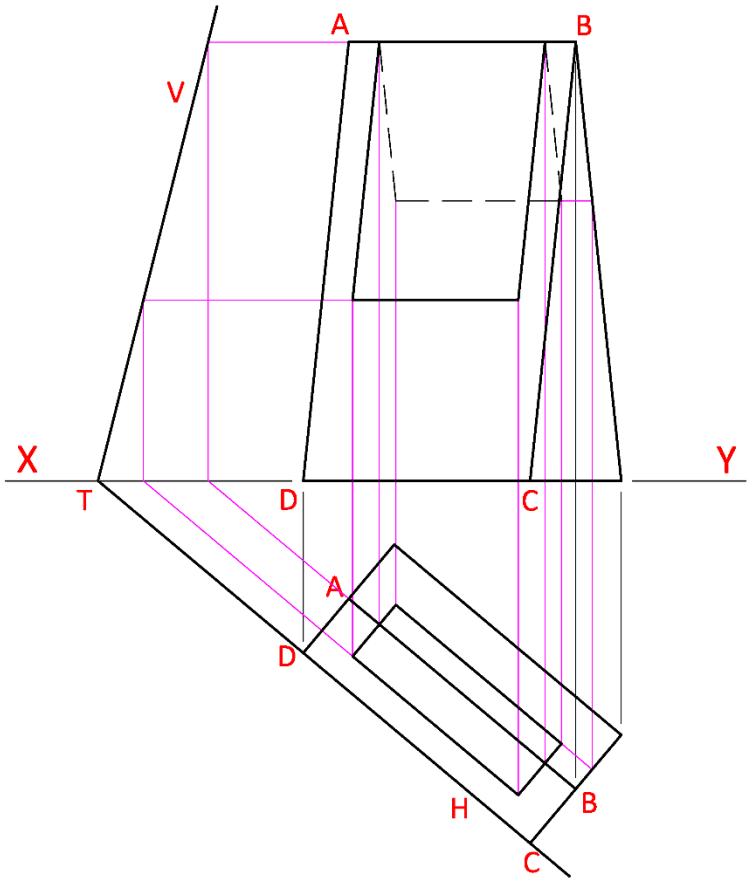
Question A-1



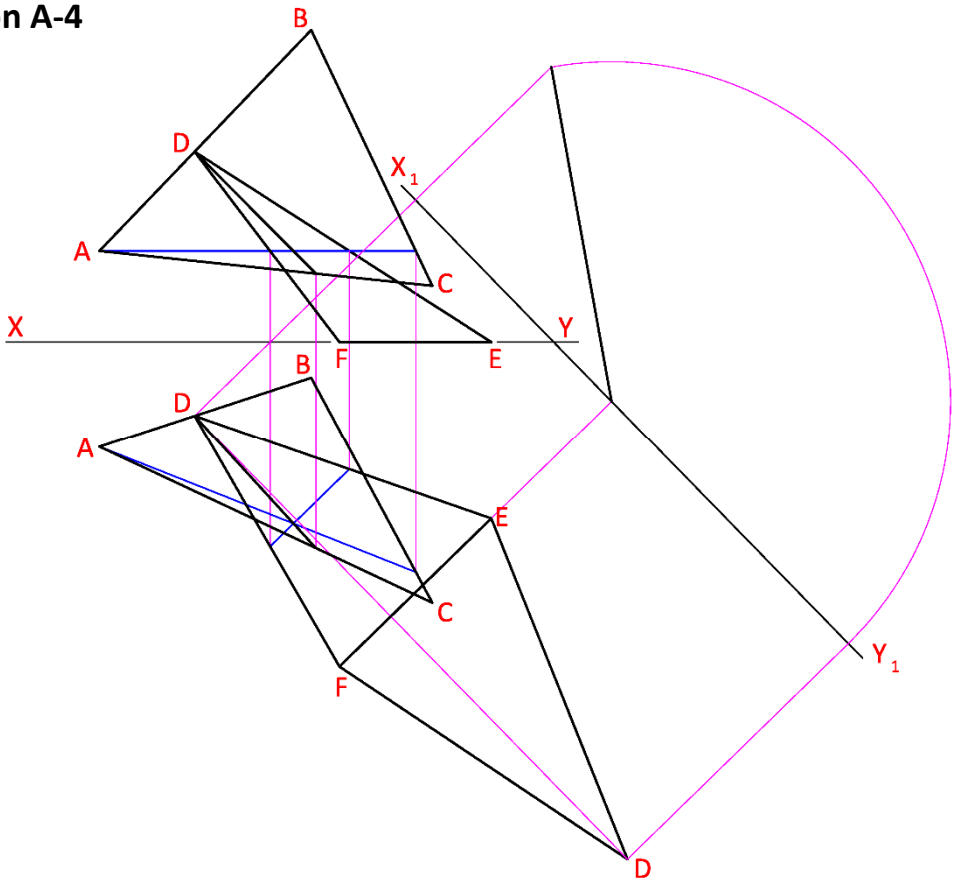
Question A-2

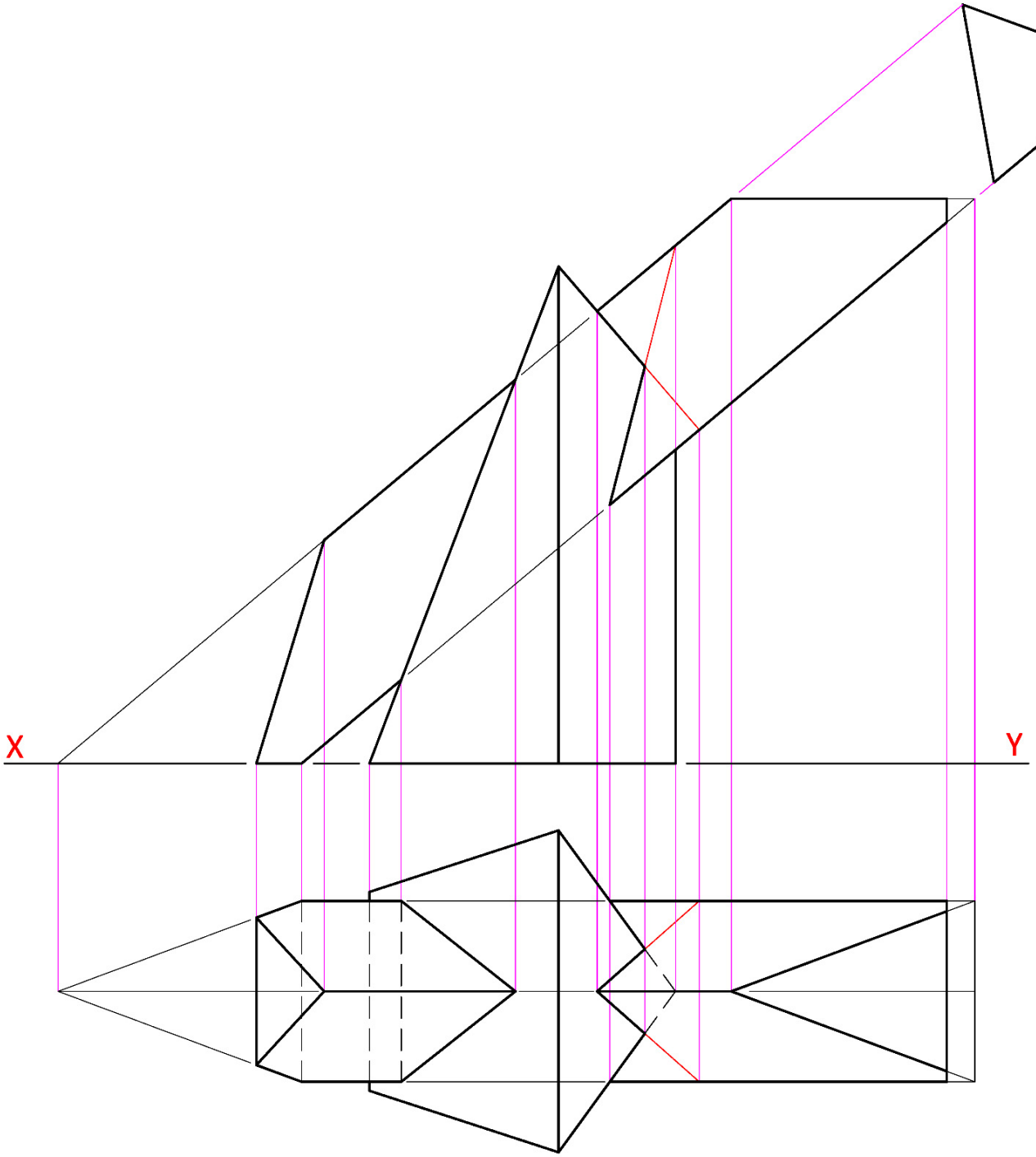


Question A-3

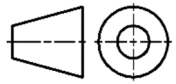


Question A-4





Design & Communication Graphics – Higher Level	
	Marking Scheme
	Question B-1
	Scale: n/a — June 2023

Design & Communication Graphics – Higher Level		
	Marking Scheme	
	Question B-2	
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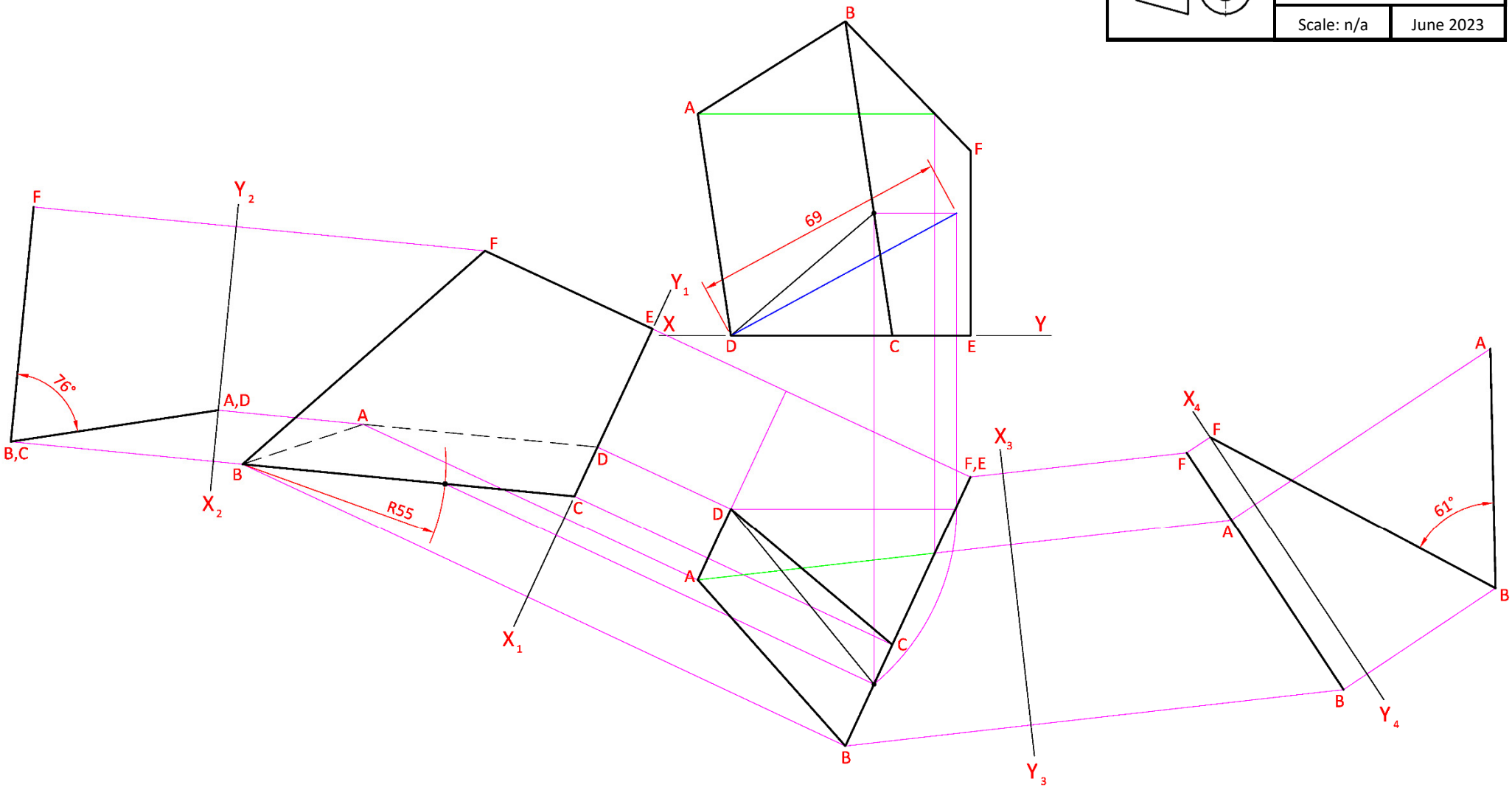

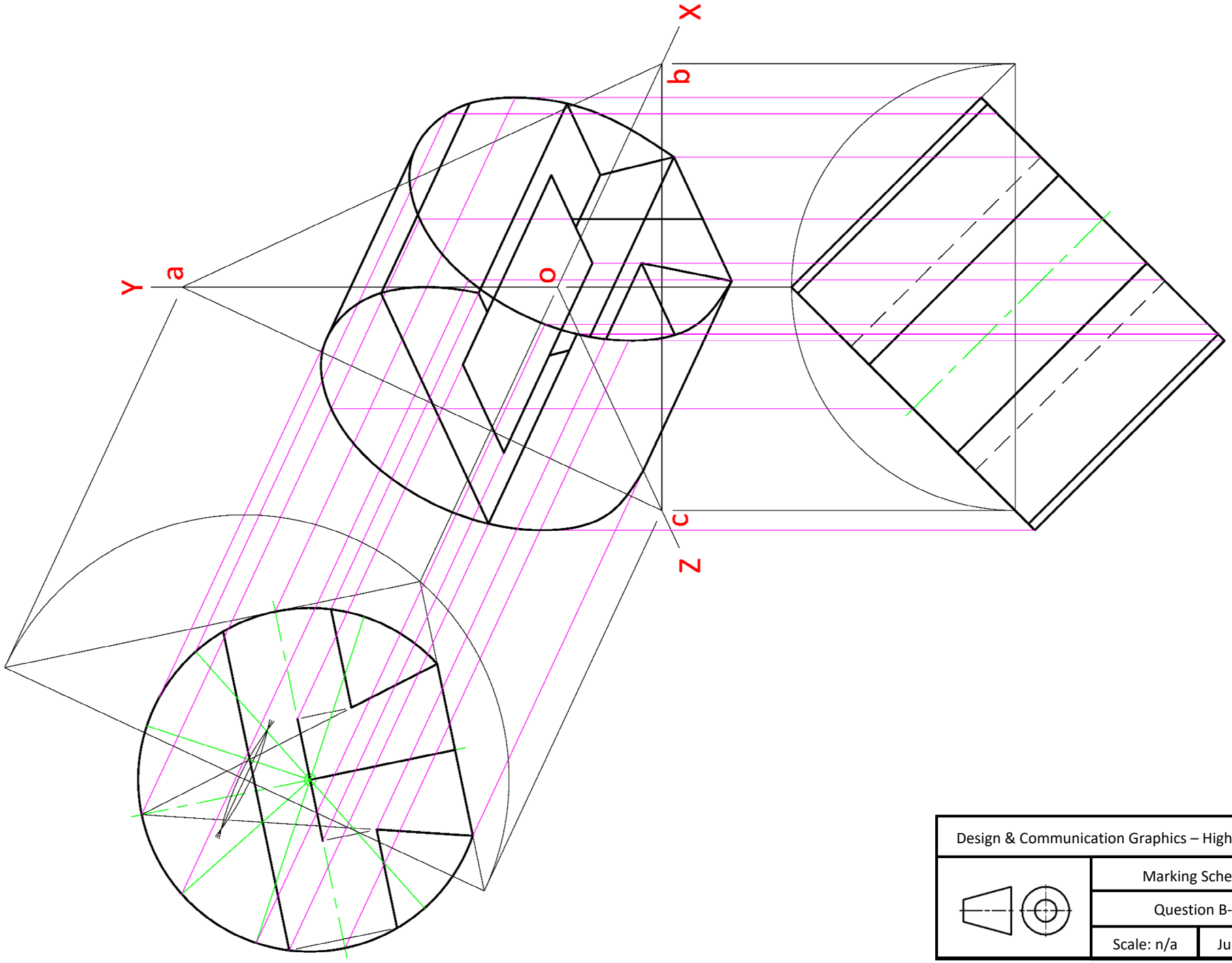

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	Question B-3
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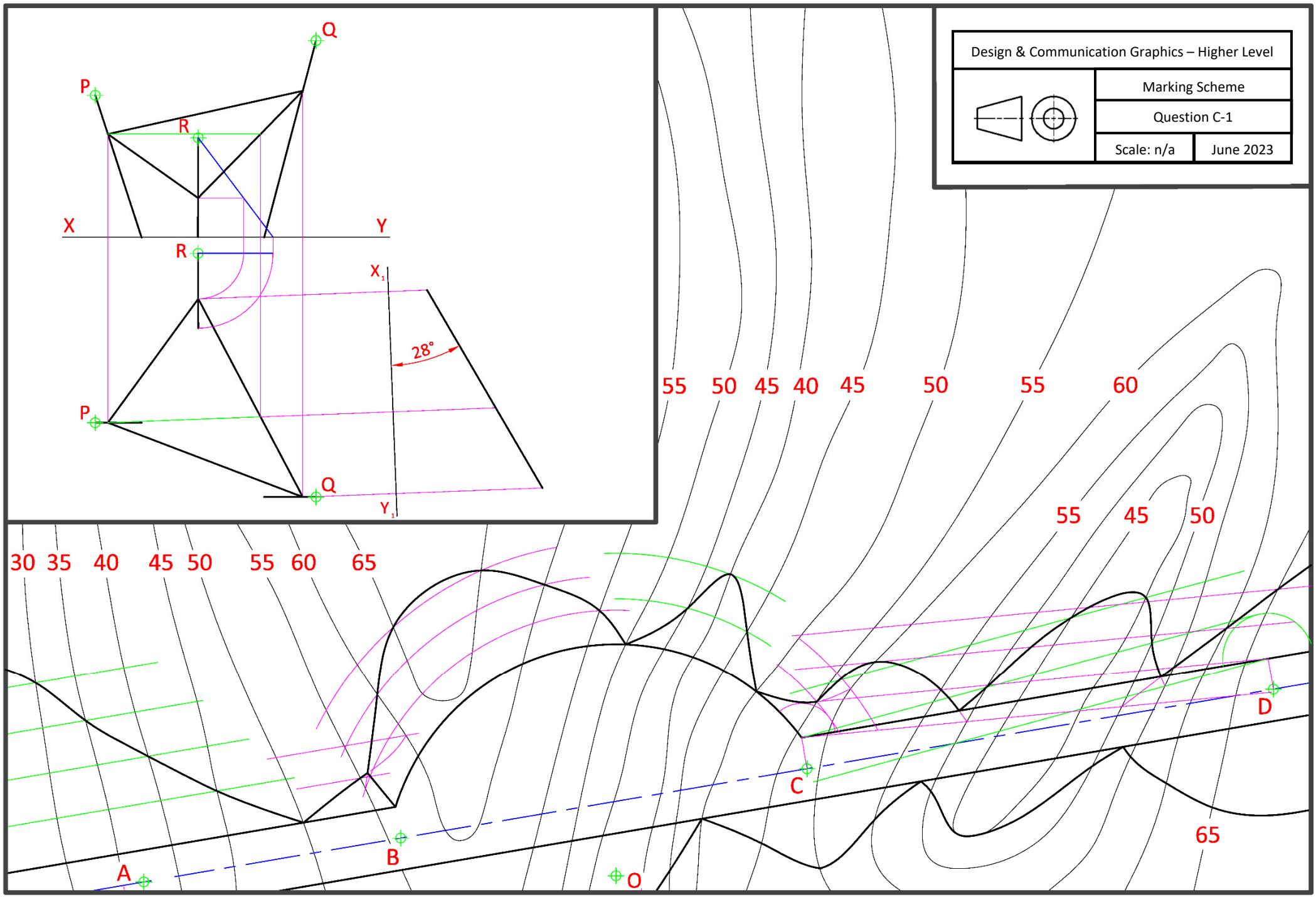

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	Question C-1
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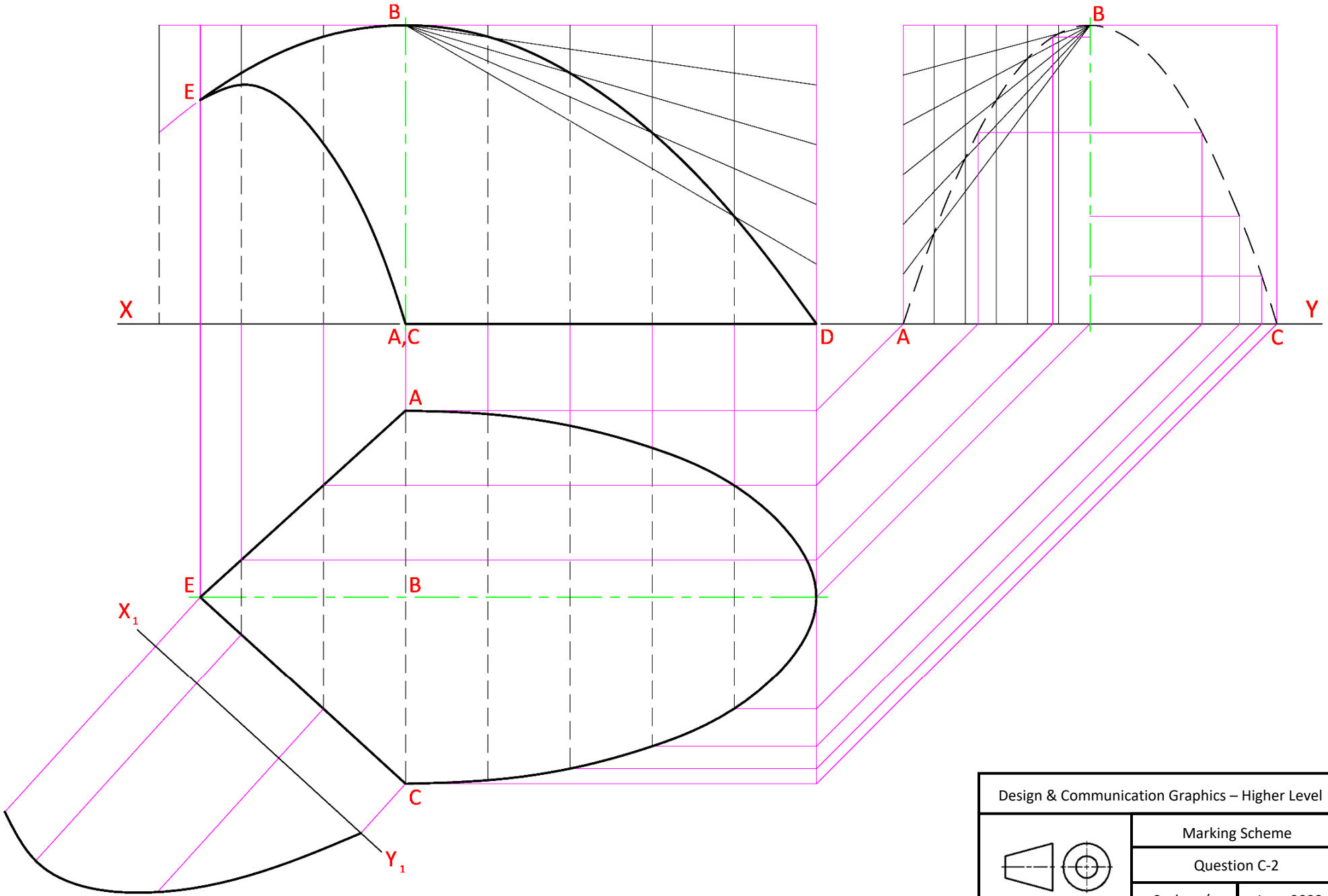

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	Marking Scheme	
	Question C-2	
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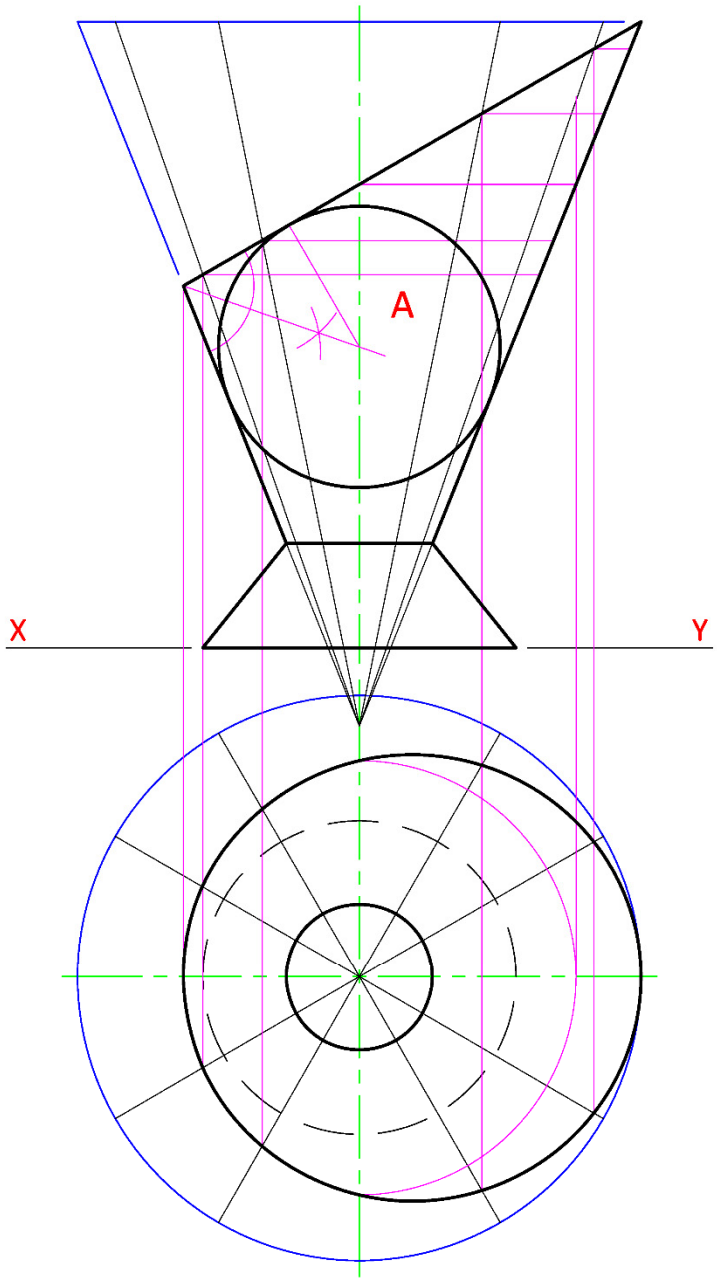

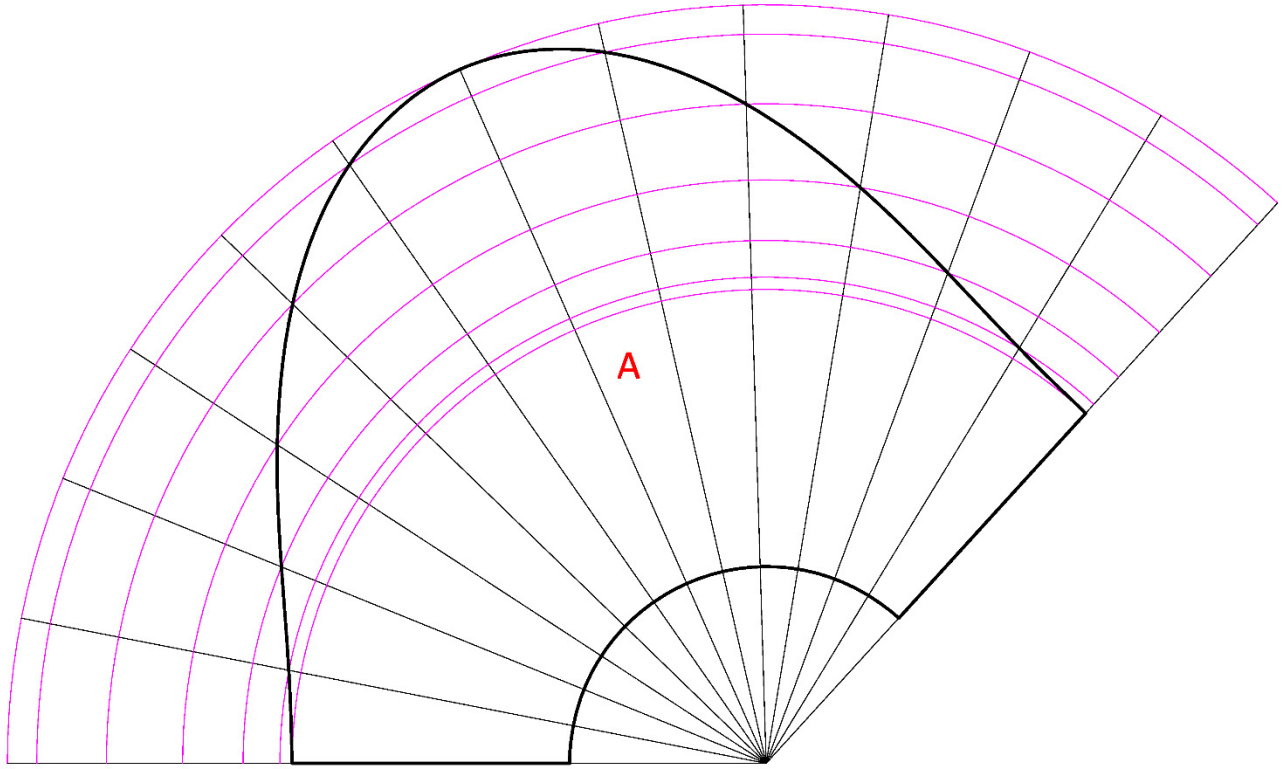

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	Marking Scheme	
	Question C-3	
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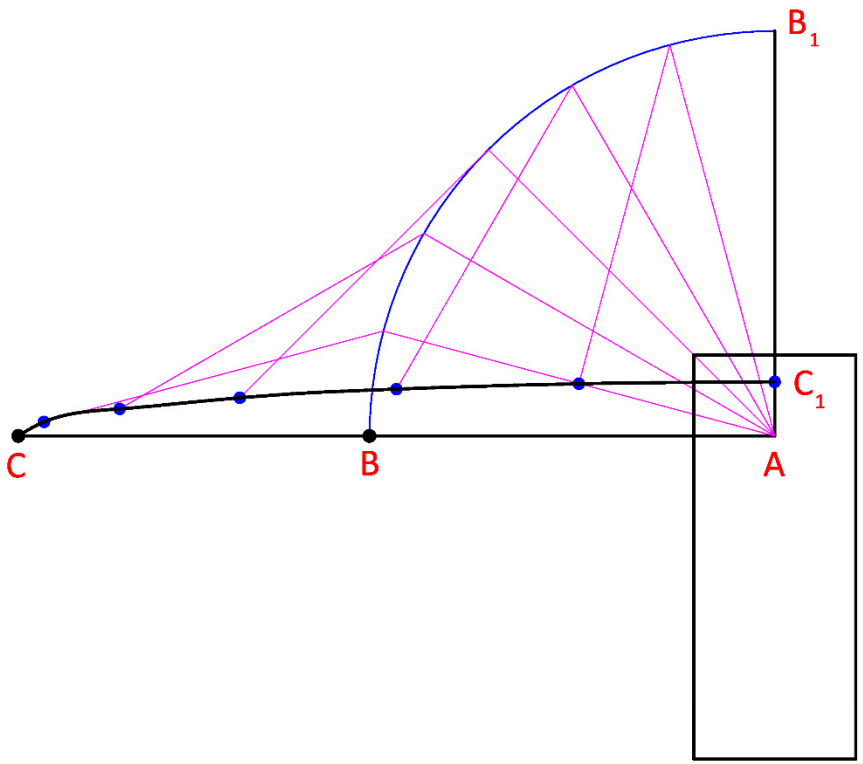

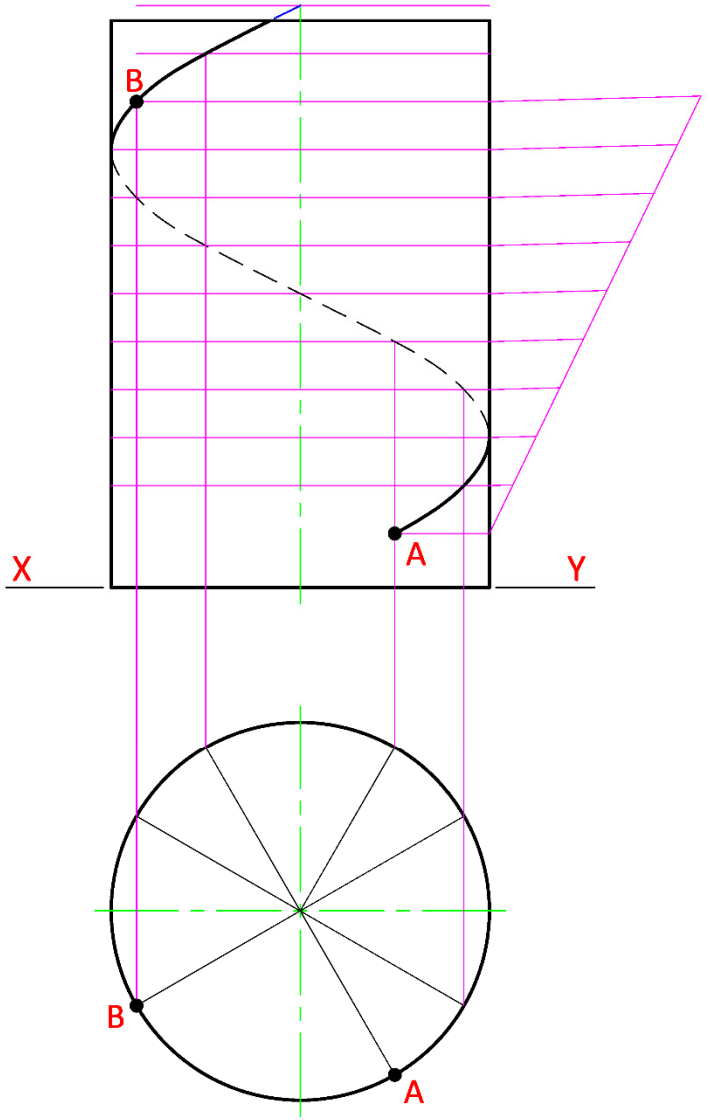

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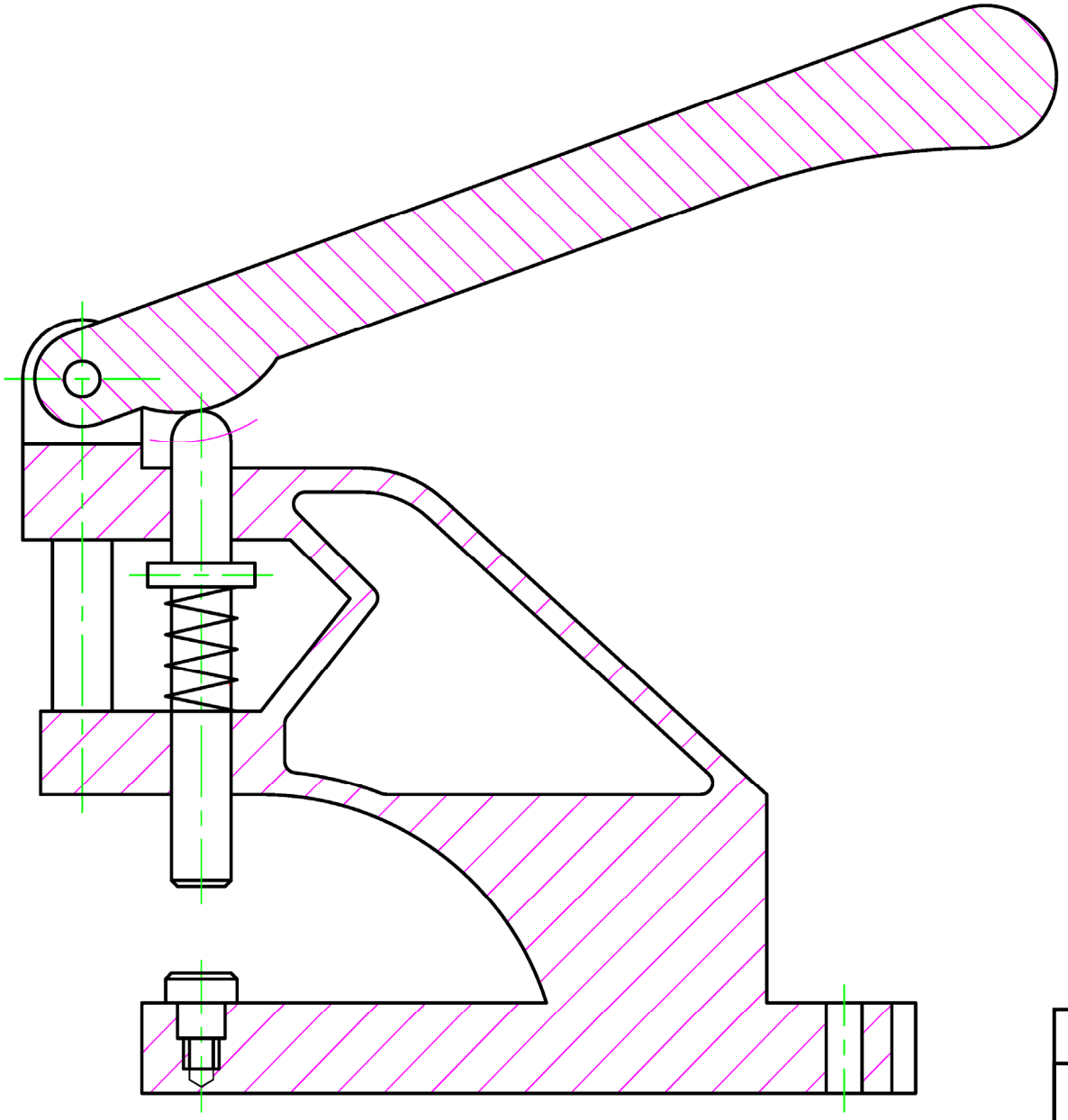

Design & Communication Graphics – Higher Level	
	Marking Scheme
	Question C-5
Scale: n/a	June 2023

Design and Communication Graphics

Student Assignment - Higher Level

Assessment Sheet 2023

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Candidate Examination No. _____

Output	Marking criteria				Marks
1	**Design Research & Design Feature Comparison**				
	Exploration of main design features using primary & secondary research; Selection of appropriate graphics; Selection of two appropriate images; Main dimensions inserted; Comparison of main design features; Contrasting of main design features; Effective layout and presentation of information combining images, sketches & annotations		**30**		
2	**Freehand Graphical Representation**				
	Proportion; Form/Volume; Use of Tone/Line for effective rendering; Detailed communication of main design features to include 3D presentation quality drawing; Layout & presentation		**20**		
3	**SolidWorks Parts, Assembly, Drawing** and **eDrawing files**				
	Adherence to required filing structure	**35**	**4**		
	Creation of a minimum of 5 Part files		**2**		
	Part models - Proficiency in Parametric CAD, including economy of design and design intent; Selection of most appropriate profiles; Sketches fully defined; Features renamed; Appropriate type of extrusions/end conditions used		**15**		
	Factor of difficulty/Design intent		**5**		
	Assembly - Creation of Assembly; Accuracy of parts to facilitate correct assembly; Correct mating of parts; Application of appropriate appearances		**7**		
	eDrawing of CAD model		**2**		
4	**Hard Copy outputs from SolidWorks**				
	Detailed orthographic views of the selected artefact; Section/Detail views where appropriate; pictorial view of the Assembly; Exploded view of the CAD model; Inclusion of main dimensions, notes and symbols; Appropriate scaling, layout and presentation to be considered		**15**		
5	**Graphical exploration of design solutions**				
	Exploration of theme/possible solution(s); Justification of chosen solution(s); Use of appropriate images/graphics; Effective layout and presentation of information combining images, sketches & annotations		**25**		
6	**Presentation of Modification/Concept Design**				
	Proportion; Form/Volume; Use of Tone/Line for effective rendering; Detailed communication of modified/concept design features; Layout and presentation		**10**		
7	**Hard copy outputs from SolidWorks**				
	CAD Model, factor of difficulty/design intent	**25**	**10**		
	Detailed orthographic views of the proposed solution; Section/Detail views where appropriate; Rendered pictorial view of the CAD model; Photorealistic images; Inclusion of main dimensions, notes and symbols; Appropriate scaling, layout and presentation to be considered		**15**		
				Sub-total	
				Marks deducted for pages in excess of maximum	
				Assignment Total	

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